

## WHAT IS CLAIMED IS:

1. A circuit modification method of modifying a circuit by inserting one or more buffers into a

5 predetermined wire located within the circuit, the method comprising the steps of:

determining whether a glitch error is caused in said predetermined wire by one or more aggressors each comprised of one or more other wires;

10 when determining that a glitch error is caused in said predetermined wire by one or more aggressors, determining one or more positions where one or more buffers are to be inserted into said predetermined wire based on a coupling capacity between each of said one or more  
15 aggressors and said predetermined wire.

2. The circuit modification method according to Claim 1, wherein said insertion position determining step

includes the steps of, when determining that a glitch error

20 is caused in said predetermined wire by only one aggressor, calculating a target coupling capacity using the coupling capacity between said aggressor and said predetermined wire, and, when dividing said predetermined wire into a plurality of wire segments, determining one or more

25 internal points of division of said predetermined wire so that a coupling capacity between each of said plurality of wire segments and said aggressor does not exceed said target coupling capacity, and setting said one or more internal points of division to said one or more positions

30 where said one or more buffers are to be inserted into said

predetermined wire.

3. The circuit modification method according to Claim  
2, wherein said target coupling capacity calculating step  
5 is the step of calculating said target coupling capacity by  
using an amount of glitch to be caused in said  
predetermined wire by said aggressor.

4. The circuit modification method according to Claim  
10 3, wherein said target coupling capacity calculating step  
includes the steps of determining the number of said  
plurality of wire segments based on said amount of glitch,  
and calculating said target coupling capacity based on said  
coupling capacity between said aggressor and said  
15 predetermined wire and the number of said plurality  
determined in the above step.

5. The circuit modification method according to Claim  
4, wherein said wire segment number determining step is the  
20 step of, when the coupling capacity between said aggressor  
and said predetermined wire is  $C_c$ , said amount of glitch is  
 $V$ , and a predetermined value is  $V_{max}$ , determining the  
smallest integer number  $n$  which satisfies a following  
relationship:  $V/n \leq V_{max}$  as the number of said plurality of  
25 wire segments, and wherein said target coupling capacity  
calculating step is the step of calculating said target  
coupling capacity as follows:  $C_c/n$ , and said internal  
division point determining step is the step of determining  
said one or more internal points of division so that the  
30 coupling capacity between each of said plurality of wire

segment and said aggressor is equal to said target coupling capacity  $C_c/n$ .

6. The circuit modification method according to Claim 3, wherein said target coupling capacity calculating step is the step of, when the coupling capacity between said aggressor and said predetermined wire is  $C_c$ , said amount of glitch is  $V$ , and a predetermined value is  $V_{max}$ , calculating said target coupling capacity as follows:  $C_c \cdot V_{max}/V$ .

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7. The circuit modification method according to Claim 1, wherein said one or more buffers to be inserted into said predetermined wire have a driving ability equal to or greater than that of a driving circuit for driving said predetermined wire.

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8. The circuit modification method according to Claim 7, further comprising the step of selecting a type of buffer having a driving ability equal to or greater than that of said driving circuit for driving said predetermined wire and having a minimum area as each of said one or more buffers to be inserted into said predetermined wire from among a plurality of buffer cells stored in a cell library.

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9. The circuit modification method according to Claim 1, further comprising the steps of, when determining that a glitch error is caused in said predetermined wire by one or more aggressors, replacing a driving circuit for driving said predetermined wire with another one having a higher driving ability than the driving circuit, and, before

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performing said insertion position determining step,  
determining whether a glitch error is caused in said  
predetermined wire driven by the other driving circuit by  
said one or more aggressors.

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10. The circuit modification method according to  
Claim 1, wherein said insertion position determining step  
includes the steps of, when determining that a glitch error  
is caused in said predetermined wire by a plurality of  
10 aggressors, calculating a plurality of target coupling  
capacities respectively associated with said plurality of  
aggressors by using the coupling capacity between each of  
said plurality of aggressors and said predetermined wire,  
and, when dividing said predetermined wire into a plurality  
15 of wire segments, determining one or more internal points  
of division of said predetermined wire so that a coupling  
capacity between each of said plurality of wire segments  
and each of said plurality of aggressors does not exceed a  
corresponding one of said plurality of target coupling  
20 capacities, and setting said one or more internal points of  
division to said one or more positions where said one or  
more buffers are to be inserted into said predetermined  
wire.

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11. The circuit modification method according to  
Claim 10, wherein said target coupling capacity calculating  
step includes the steps of, when the coupling capacity  
between each of said plurality of aggressors (referred to  
as  $i$ th ( $i=1$  to  $k$ ,  $k$  is the number of aggressors) aggressor  
30 hereafter) and said predetermined wire is  $Cc_i$  ( $i=1$  to  $k$ ),

an amount of glitch to be caused in said predetermined wire by the  $i$ th aggressor is  $V_i$  ( $i=1$  to  $k$ ), and a predetermined value is  $V_{max}$ , determining the smallest integer number  $n_i$  ( $i=1$  to  $k$ ) which satisfies a following relationship:

5  $V_i/n_i$  Vmax ( $i=1$  to  $k$ ) as the number of said plurality of wire segments for each of said plurality of aggressors, and calculating each of said plurality of target coupling capacities as follows:  $Cc_i/n_i$  ( $i=1$  to  $k$ ).

10           12. The circuit modification method according to  
Claim 10, wherein said insertion position determining step  
includes the steps of when dividing said predetermined wire  
into a plurality of wire segments for each of said  
plurality of aggressors, determining said one or more  
15 internal points of division of said predetermined wire so  
that the coupling capacity between each of said plurality  
of wire segment and each of said plurality of aggressor is  
equal to said corresponding target coupling capacity, and  
selecting said one or more positions where one or more  
20 buffers to be inserted into said predetermined wire from  
among all internal points of division determined in the  
above step for said plurality of aggressors.

13. The circuit modification method according to  
25 Claim 11, wherein said insertion position determining step  
includes the steps of when dividing said predetermined wire  
into a plurality of wire segments for each of said  
plurality of aggressors, i.e., said *ith* aggressor,  
determining said one or more internal points of division of  
30 said predetermined wire so that the coupling capacity

between each of said plurality of wire segment and said  $i$ th aggressor is equal to said corresponding target coupling capacity  $Cc_i/n_i$  ( $i=1$  to  $k$ ), and selecting said one or more positions where one or more buffers to be inserted into  
 5 said predetermined wire from among all internal points of division determined in the above step for said plurality of aggressors.

14. The circuit modification method according to  
 10 Claim 10, wherein said target coupling capacity calculating step includes the steps of, when the coupling capacity between each of said plurality of aggressors (referred to as  $i$ th ( $i=1$  to  $k$ ,  $k$  is the number of aggressors) aggressor hereafter) and said predetermined wire is  $Cc_i$  ( $i=1$  to  $k$ ),  
 15 an amount of glitch to be caused in said predetermined wire by said  $i$ th aggressor is  $V_i$  ( $i=1$  to  $k$ ), and a predetermined value is  $V_{max}$ , calculating each of said plurality of target coupling capacities as follows:  $Cc_i * V_{max} / V_i$  ( $i=1$  to  $k$ ).

20 15. A circuit modification method of modifying a circuit by inserting one or more buffers into a predetermined wire located within the circuit, the method comprising the steps of:

determining whether a glitch error is caused in said  
 25 predetermined wire by an aggressor comprised of one or more other wires;

when determining that a glitch error is caused in said predetermined wire by an aggressor, determining a number of buffers to be inserted into said predetermined  
 30 wire based on an amount of glitch to be caused in said

predetermined wire by said aggressor.

16. The circuit modification method according to Claim 15, wherein said buffer number determining step is  
5 the step of, when said amount of glitch is  $V$  and a predetermined value is  $V_{\max}$ , calculating the smallest integer number  $n$  which satisfies a following relationship:  
 $V/n \leq V_{\max}$ .

10 17. The circuit modification method according to Claim 15, wherein said one or more buffers to be inserted into said predetermined wire have a driving ability equal to or greater than that of a driving circuit for driving said predetermined wire.

15 18. The circuit modification method according to Claim 17, further comprising the step of selecting a type of buffer having a driving ability equal to or greater than that of said driving circuit for driving said predetermined  
20 wire and having a minimum area as each of said one or more buffers to be inserted into said predetermined wire from among a plurality of buffer cells stored in a cell library.

19. The circuit modification method according to  
25 Claim 15, further comprising the steps of, when determining that a glitch error is caused in said predetermined wire by one aggressor, replacing a driving circuit for driving said predetermined wire with another one having a higher driving ability than the driving circuit, and, before performing  
30 said buffer number determining step, determining whether a

glitch error is caused in said predetermined wire driven by the other driving circuit by said one aggressor.

20. A circuit modification method comprising the  
5 steps of:

determining whether a glitch error is caused in said predetermined wire by an aggressor comprised of one or more other wires;

when determining that a glitch error is caused in  
10 said predetermined wire by an aggressor, replacing a driving circuit for driving said predetermined wire with another one having a higher driving ability than the driving circuit.

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